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IS 2742-1 (1994): Automotive Vehicles - Brake Linings (Non-Rubberized), Part 1: Specification [TED 4: Automotive Braking Systems]

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स्वचल वाहन — ब्रेक आस्तर (गैर रबड़कृत)

भाग 1 विशिष्ट

(पहला पुनरीक्षण)

Indian Standard

AUTOMOTIVE VEHICLES — BRAKE LININGS (NON-RUBBERIZED)

PART 1 SPECIFICATION

(First Revision)

UDC 629·113-597·6

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

May 1994

Price Group 3

Automotive Braking Systems Sectional Committee, TED 4

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Automotive Braking Systems Sectional Committee had been approved by the Transport Engineering Division Council.

This Indian Standard was first published in 1964. The present revision was considered necessary on the basis of experience gained in the manufacture and testing of friction materials. The brake lining of braking system of automotive vehicles is considered as of significant importance because of their role in overall safety of vehicle.

The requirements laid down in this standard are to be used as quality control parameters on brake linings, both as inplant control by the lining manufacturers and for quality assessment procedure by the purchasers. It is accepted that the actual values of the various parameters can be finalized only after carrying out tests on trial production batches and shall be agreed between the supplier and the purchaser for each approved type of lining.

This Indian Standard is one in the series of standards being developed for brake linings of automotive vehicles. The other parts are:

IS 2742 (Part 2) : 1994	Automotive vehicles — Brake linings (Rubberized) : Part 2 Specification
IS 2742 (Part 3) : 1994	Automotive vehicles — Brake linings : Part 3 Methods of test
IS 2742 (Part 4) : 1994	Automotive vehicles — Brake linings : Part 4 Coefficient of friction — Method of test
IS 2742 (Part 5) : 1994	Automotive vehicles — Brake linings : Part 5 Internal shear strength — Method of test

The following Indian Standards are important adjuncts to this standard:

IS 10376 : 1982	Automotive vehicles — Braking systems — Performance requirements for mopeds
IS 11716 : 1986	Automotive vehicles — Braking systems — Performance requirements for scooters and motorcycles
IS 11852 (Parts 1 to 7) : 1987	Recommendation for brakes and braking systems for automotive vehicles
IS 13670 : 1992	Automotive vehicles — Three wheelers — Brake performance requirements

The committee responsible for the preparation of this standard is given in Annex A.

For the purpose of deciding whether a particular requirements of this standard is complied wtih, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

AUTOMOTIVE VEHICLES — BRAKE LININGS (NON-RUBBERIZED)

PART 1 SPECIFICATION

(First Revision)

1 SCOPE

This standard (Part 1) covers the terminology, dimensional tolerances and other performance requirements of non-rubberized brake linings of drum brakes.

2 REFERENCES

The following Indian Standards are necessary adjuncts to this standard:

IS No.	*Title*
2500 (Part 1) : 1992	Sampling inspection procedures : Part 1 Attribute sampling plans indexed by acceptable quality level (AQL) for lot by lot inspection (*second revision*)
2742 (Part 3) : 1994	Automotive vehicles — Brake linings : Part 3 Methods of test
2742 (Part 4) : 1994	Automotive vehicles — Brake linings : Part 4 Co-efficient of friction — Methods of test
2742 (Part 5) : 1994	Automotive vehicles — Brake linings : Part 5 Internal shear strength — Method of test

3 TERMINOLOGY

For the purpose of this standard, the following definitions shall apply.

3.1 Brake Lining

A piece of friction material used on brake assembly.

3.2 Moulded Lining

Lining made from a mixture of fibre mixed with suitable fillers and bonding agents and appropriately processed.

3.3 Woven Lining

Lining made with woven fabric as a base. It may be rigid or flexible,

3.4 Rigid Lining

Lining which is formed to fit a specific brake drum diameter.

3.5 Flexible Lining

Lining which is adaptable to brake drums of different diameters.

3.6 Heat Swell

It is the difference in thickness as measured at ambient and hot conditions.

3.7 Water Swell

The difference in thickness of specimen measured at five points equally spaced along the length of the blank and on the centre point of the width before and after soaking in water.

3.8 Normal Coefficient of Friction

It is defined as the average of four values at temperature of 93°C, 121°C, 149°C and 205°C during second fade test.

3.9 Hot Friction Coefficient

It is defined as the average of 10 points at 205°C, 149°C on the first recovery, 233°C, 261°C, 289°C, 317°C and 345°C on the second fade and 261°C, 205°C and 149°C on the second recovery.

NOTE — If any temperature point or points required for calculating friction coefficient are not reached within the prescribed time limit, the coefficient of friction value at 10th minute shall be used to give the full number of points required.

3.10 Blisters

It is a local separation of a layer of lining due to accumulated gas causing a protuderance on the surface.

4 GENERAL REQUIREMENTS

4.1 The finished brake lining shall be free from defects, such as cracks, scoring, indentations, unevenness or other defects affecting its life and serviceability.

4.2 The frictional characteristic of the linings as declared by the lining manufacturers shall be maintained throughout the life of the wearing portion.

4.3 The linings shall conform to the requirements stipulated when tested any time within a year of normal storage provided the linings are stored according to the lining manufacturer's recommendations. In case of bonded linings, they shall have such qualities as to permit it to be bonded with a suitable adhesive.

5 SAMPLING

Unless otherwise agreed upon between the manufacturer and the purchaser, the sampling scheme shall be in accordance with IS 2500 (Part 1) : 1992.

6 DIMENSIONAL TOLERANCES

6.1 Unless otherwise agreed to, the tolerances on dimensions of brake lining shall be as given in Table 1. These tolerances are applicable to the brake linings as supplied by the manufacturer for assembly.

Table 1 Tolerances on Dimensions of Brake Lining

All dimensions in millimetres.

	Tolerances on Thickness	Tolerances on Width	Tolerances on Length
Up to and including 5 mm thickness	+ 0 − 0·2	+ 0 − 0·5	+ 1·5 − 0
Over 5 mm thickness	+ 0 − 0·3	+ 0 − 0·5	+ 1·5 − 0

6.2 For checking convexity or concavity, if so desired by the purchaser, a suitable radius gauge shall be used with an appropriate force related to bonding or riveting force. The lining shall be so held that the gaps if any at the ends on the inner surface of the lining shall be as follows:

Thickness	*Gap*
Up to and including 10 mm	0·1 mm (*Max*)
Over 10 mm	0·5 mm (*Max*)

Test shall be carried out on a reasonably representative sample size as agreed to between the purchaser and the manufacturer.

6.3 Depth of Counterbore for Riveting

The depth of the counterbore shall be as specified by the brake or vehicle manufacturer.

7 TEST REQUIREMENTS

7.1 The following properties shall be specified by the manufacturer. Any other requirements shall be as agreed upon between the lining manufacturer and the purchaser.

a) Normal friction coefficient
b) Hot friction coefficient
c) Specific gravity
d) Hardness
e) Cross breaking strength
f) Acetone extract
g) Water swell
h) Loss of weight on ignition
j) Heat swell
k) Shear strength

7.2 The test for the properties are to be carried out as detailed in Parts 3, 4 and 5 of IS 2742 : 1994. The acceptance norm for properties other than those listed below shall be as agreed between the purchaser and the manufacturer of brake linings:

a) Water swell,
b) Heat swell, and
c) Normal and hot coefficient of friction.

7.3 Water Swell

The maximum water swell of the lining shall not exceed the following values when tested as per **5.6** of IS 2742 (Part 3) : 1994.

Thickness (mm)	*Swell* (mm)
Up to 10	0·04
10 ⩽ 20	0·1

7.4 Heat Swell

The heat swell of linings shall not exceed 0·25 mm when tested as per **5.8** of IS 2742 (Part 3) : 1994.

7.5 Normal and Hot Coefficient of Friction

The normal and hot coefficient of friction measured as per IS 2742 (Part 4) : 1994 shall be within ± 0·05 of the value declared by the manufacturer.

8 DESIGNATION

8.1 Linings shall be designated by their type (moulded, rigid, woven and flexible) suitably in codes, friction coefficients (both normal and ot) and size designation; if oversized the extent of oversize in millimetres and IS number and relevant part.

Example — M 40/28 (Standard size designation) × 5 IS 2742/1.

Indicates an oversized moulded non-rubberized lining with normal/hot friction coefficient of 0·40 and 0·28 followed by size designation in code or otherwise, with an oversize of 5 mm and falling under Part 1 of IS 2742 : 1994.

9 MARKING

9.1 Each brake lining shall be clearly marked with its size, designation, make and type. Where applicable, the vehicle reference or part number may also be marked.

9.2 BIS Certification Marking

The product may also be marked with Standard Mark.

9.2.1 The use of the Standard Mark is governed by the provisions of the BIS Act 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to the manufacturers or producers may be obtained from BIS.

9.2.2 An oversize lining shall be marked with a suffix to the standard size to indicate the extent of oversize. The suffix shall only be a number which shall indicate the oversize in millimetres. The marking shall be preferably on the inner surface or sides. In case this is not possible because of non-availability of space or functional requirements, the markings may be made on the upper surface.

9.3 The normal coefficient of friction and hot coefficient of friction shall also be marked on the lining as shown below:

Example — 0·40/0·28 shall be marked as 40/28.

10 PACKING

It shall be as per best trade practice.

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Automotive Braking Systems Sectional Committee, TED 4

Chairman	*Representing*
Shri R. Ramakrishnan	Ashok Leyland Ltd, Madras
Members	
Shri P. Nageshwar Rao (*Alternate* to Shri R. Ramakrishnan)	
Shri H. K. Acharya Shri Y. V. Nagaraj (*Alternate*)	Enfield India Ltd, Madras
Shri T. M. Balaraman Shri C. Y. Deshpande (*Alternate*)	Bajaj Auto Ltd, Pune
Shri B. K. Ghosh Shri S. P. Tiwari (*Alternate*)	Tata Engineering and Locomotive Co Ltd, Pune
Shri K. C. Jain Shri R. K. Gupta (*Alternate*)	Escorts Ltd (MSD), Faridabad
Shri A. K. Jindal	Swaraj Mazda Ltd, Chandigarh
Shri P. D. Joshi Shri C. M. Mehta (*Alternate*)	Scooters India Ltd, Lucknow
Shri I. G. Kandaraji Shri Alok Nigam (*Alternate*)	HMT Ltd (Tractor Division), Pinjore
Shri J. S. Shadilkar Shri S. S. Patil (*Alternate*)	Kalyani Brakes Ltd, Pune
Shri S. S. Khosla Shri A. P. Singh (*Alternate*)	DGTD, New Delhi
Shri V. R. Marathe Shri P. V. Bhandre (*Alternate*)	Kinetic Engineering Ltd, Pune
Lt Col A. K. Mehrotra Major K. R. Singh (*Alternate*)	Controllerate of Quality Assurance (Vehicles), Ahmednagar
Shri O. P. Middha Shri Habib Rahmathulla (*Alternate*)	Allied Nippon Ltd, Sahibabad
Shri M. K. Mishra Shri B. L. Pathariya (*Alternate*)	Vehicles Factory, Jabalpur
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Shri A. K. Sen Shri N. Karuppaiah (*Alternate*)	Vehicle Research and Development Establishment, Ahmednagar
Shri S. N. Srinivasan Shri V. Murugan (*Alternate*)	Premier Automobiles Ltd, Bombay
Shri S. R. Tapade Shri S. Kumar (*Alternate*)	Central Institute of Road Transport, Pune
Shri V. S. Venkatesan Shri K. N. Balaji (*Alternate*)	Brakes India Ltd, Madras
Shri N. S. Vijayaraghavan, Director (Transport Engineering)	Director General, BIS (*Ex-officio Member*)

Member Secretary

Shri M. V. S. D. Prasada Rao

Deputy Director (Transport Engineering), BIS

(*Continued on page 5*)

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Two and Three Wheelers Braking Systems Subcommittee, TED 4 : 1

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Shri T. M. Balaraman	Bajaj Auto Ltd, Pune
Shri S. B. Gupta	Hero Honda Motors Ltd, Dharuhera
Shri P. R. Rao (*Alternate*)	
Shri J. S. Khadilkar	Kalyani Brakes Ltd, Pune
Shri S. S. Patil (*Alternate*)	
Shri V. R. Marathe	Kinetic Engineering Ltd, Pune
Shri P. V. Bhandre (*Alternate*)	
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Shri V. M. Mundada	Bajaj Tempo Ltd, Pune
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Shri K. H. Ramachandrappa	Vehicle Research and Development Establishment, Ahmednagar
Dr C. I. Dhamijani (*Alternate*)	
Shri S. Ramaswamy	Hindustan Ferodo Ltd, Bombay
Shri K. Vijayakumar	Kerala Automobiles Ltd, Trivandrum